BATTERY CALCULATIONS
FAP–001–77A

ITEM	DESCRIPTION	QTY	STANDBY CURRENT PER ITEM (AMPS)	TOTAL STANDBY CURRENT PER ITEM	ALARM CURRENT PER ITEM (AMPS)	TOTAL ALARM CURRENT PER ITEM
CP–35	FACP w/2ZN'S + AUD	1	0.1750	0.1750	0.5010	0.5010
PS–35	POWER SUPPLY	2	0.0000	0.0000	0.0000	0.0000
BC–35	BATTERY CHARGER	1	0.0450	0.0450	0.0300	0.0300
AE–30U	CLASS B BELL MODULE	2	0.0065	0.0130	0.0400	0.0800
PM–32	MATRIX MODULE	1	0.0000	0.0000	0.0000	0.0000
RM–30U	RELEASE MODULE	–	0.0050	0.0000	1.5000	0.0000
SM–30	SWITCH MODULE	3	0.0000	0.0000	0.0450	0.1350
SR–32	6 RELAY MODULE	1	0.0000	0.0000	0.0450	0.0450
SR–35	8 RELAY MODULE	1	0.0000	0.0000	0.0210	0.0210
TC–30U	BATTERY TRANSFER	–	0.0000	0.0000	0.0500	0.0000
TL–30U	TIME LIMIT	–	0.0300	0.0000	0.0150	0.0000
ZN–34US	SUPERVISORY MODULE	1	0.0100	0.0100	0.1100	0.1100
ZU–35	ZONE MODULE	1	0.0090	0.0090	0.1100	0.1100
ZU–35DS	ZONE MODULE/SD's	2	0.0090	0.0180	0.1100	0.2200
SMOKE	SMOKE DETECTOR	7	0.0001	0.0007	0.0010	0.0070
MOI	TRANSMITTER	1	0.1200	0.1200	0.1750	0.1750
MID	INPUT BOARD	1	0.0020	0.0020	0.0000	0.0000
PS–5A	POWER SUPPLY	1	0.0380	0.0380	0.0000	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT						0.2500
	TOTAL SYSTEM CURRENT		STANDBY	0.4307	ALARM	1.6840

MIN. BATTERY CAPACITY = {(TOT. STANDBY CURRENT X STANDBY TIME) +
(TOT. ALARM CURRENT X ALARM TIME)} X 1.25
MIN. BATTERY CAPACITY = {(0.4307 A X 24 HR) + (1.684 A X 0.083 HR)} X 1.25
MIN. BATTERY CAPACITY = {10.3368 AHr + 0.1398 AHr} X 1.25 = 13.0957 AHr

NOTIFICATION APPLIANCE CIRCUIT
VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1: 77 DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELOCK STROBE 15 cd	–	0.5010	0.0000
WHEELOCK HORN/STROBE 15cd	–	0.0000	0.0000
WHEELOCK STROBE 30 cd	–	0.0300	0.0000
WHEELOCK HORN/STROBE 30 cd	–	0.0450	0.0000
WHEELOCK STROBE 75 cd	–	0.165	0.0000
WHEELOCK HORN/STROBE 75 cd	–	0.1100	0.0000
WHEELOCK STROBE 110 cd	–	0.1100	0.0000
WHEELOCK HORN/STROBE 110 cd	–	0.1750	0.0000
WHEELOCK HORN	–	0.0000	0.0000
AUTOCALL BELL	5	0.0500	0.2500
AUTOCALL BELL/STROBE 75 cd	–	0.2150	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT			0.2500

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM
WHERE: I = CIRCUIT CURRENT
D = CONDUCTOR LENGTH (FT) ONE WAY
21.6 = CONSTANT
CM = WIRE CROSS–SECTIONAL AREA (CIRCULAR MILS)
VD = {(0.25) (420FT) (21.64)}/4110 = 0.552V
%VD = {0.552V / 24V} X 100 = 2.299%
REMAINING VOLTS = 23.448

WIRE SIZE	CIRCULAR MILS
12AWG	6530
14AWG	4110
16AWG	2580
18AWG	1620
20AWG	1020

FIRE ALARM SYSTEM FUNCTION CHART

SYSTEM EVENT / RESPONSE	ANNUNCIATE AT FACU	FIRE SIGNAL TO RECEIVER	TROUBLE SIGNAL TO LBNL RECEIVER	SUPERVISORY SIGNAL TO LBNL RECEIVER	OPERATE 77A NOTIFICATION DEVICES	77A AHU-1,-2,-3 SHUTDOWN	77P,77Q BLUE STROBE	77P,77Q BELL
77A FIRE CALL BOXES	●	●			●			
77A FACP SMOKE DETECTOR	●	●			●			
77A (AHU-1,-2,-3) DUCT SMOKE DETECTORS	●	●			●	●		
77A FIRE SPRINKLER WATERFLOW SWITCH	●	●			●			
77A FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●				
77A WASTE TREATMENT UNIT FIRE SPRINKLER WATERFLOW SWITCH	●	●						
77A WASTE TREATMENT UNIT FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●				
77P,77Q DRY CHEMICAL RELEASE	●	●					●	●
77P,77Q POWER FAILURE	●		●					
AC POWER FAILURE	●		●					
SYSTEM FAULT	●		●					

AS BUILT
–
–
10/22/13

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
_	LDD	LDD	MCD	10/22/13	AS BUILT

PROFESSIONAL SEAL (IF REVISION, APPLIES ONLY TO REVISED WORK)
ISSUE (PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD)

77A FIRE ALARM SYSTEM
FUNCTION CHART & CALCULATIONS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

DRAWN BY LDD	DATE 10/22/2013
CHECKED BY LDD	10/22/2013
APPROVED BY MCD	10/22/2013
SCALE AS NOTED	
DRAWING NO. 4B77AE022_	SHEET FA
PROJECT NO. 000000	1 OF 1